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RESERVE COPY. PATENT SPECIFICATION

941,941

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COMPLETE SPECIFICATION

DRAWINGS ATTACHED

Improvements in or relating to Cheese Cutting Machines

We, G. WRIGHT & SON (DORCHESTER) LIMITED, a British Company, of Eggdon House, St. George's Road, Dorchester, in the County of Dorset, and DOUGLAS NORMAN WRIGHT, a British Subject, of the Company's address, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to cheese cutting machines for cutting whole cheeses into smaller portions, particularly into quarters or other segmental portions.

Machines for this purpose have been previously proposed, but they have not proved completely satisfactory in operation, largely due to frequent breaking of the cutting wires.

It is the object of the present invention to provide a cheese cutting machine which is reliable and satisfactory in operation.

A cheese cutting machine according to the invention comprises a vertically movable power-operated table to support a cheese to be cut, a plurality of cutting wires extending across the table and connected to downwardly-acting power operated pulling means, the said cutting wires being so supported as to lie, when the machine is not operating and the table is in its lower position, in a plane substantially parallel to that of the table and spaced above it by a distance greater than the height of a cheese, and control means for the power-operated table and for the power-operated pulling means whereby the cutting wires are free to move upwardly with the table during upward movement of said table, the pulling means being brought into operation automatically by cessation of the upward movement of the table.

The cutting wires may each be anchored at one end to an upstanding frame surrounding the table, each cutting wire passing over

a guide on the frame opposite to its anchorage point and being attached at its other end to the plunger of a fluid-pressure operated plunger-and-cylinder device arranged to exert a downward pull on the said cutting wire.

Preferably the table is also moved upwardly by a fluid-pressure operated plunger-and-cylinder device, and a valve controlling the supply of fluid under pressure to the plunger-and-cylinder devices acting on the wires is held closed during upward movement of the table by the plunger-and-cylinder device acting thereon.

The invention is hereinafter described with reference to the accompanying drawings, in which:—

Figure 1 is a plan view of one form of cheese cutting machine according to the invention;

Figure 2 is a front elevation of the machine shown in Figure 1, with the front of the machine casing removed;

Figure 3 is a side elevation with the side of the casing removed;

Figures 4 and 5 are detail views; and

Figure 6 is a diagram showing the fluid pressure system of the machine.

The valves and conduits of the fluid pressure system have been omitted from Figures 2 and 3, since the working of the system will be evident from Figure 6 and the physical arrangement and positioning of the valves and conduits are of no importance.

Referring to the drawings, the cheese cutting machine comprises a cabinet-like base 10 having a circular opening 11 in its top surface 12. A circular table 13 is mounted on the plunger 14 of a pneumatic plunger-and-cylinder device 15 fixed vertically in the centre of the cabinet so as to be movable upwardly from a position in which its upper surface lies substantially flush with the top

[Price 4s. 6d.]

of the cabinet, the table 13 being formed, in its upper side, with two diametral grooves 16 at right angles to each other. The table is guided by rods 17 sliding in guides 18 in a horizontal plate 19 mounted in the base 10.

Upstanding tubular posts 20 fixed to the top of the cabinet 10 around the opening 11 therein support a circular frame 21 at a height above the top of the cabinet somewhat greater than the height of a cheese. There are conveniently four posts spaced 90° apart, and on two adjacent ones, close to their upper ends, are mounted anchorage members 22 for two cutting wires 23 each of which extends diametrically across the frame, over a pulley 24 mounted on the opposite post 20 and down through the said post into the base 10 where it is anchored to the plunger 25 of one of two pneumatic plunger-and-cylinder devices 26.

One of the cutting wire anchorage members 22 is shown on an enlarged scale in Figure 4 and comprises a split clamp 27 the parts of which are drawn together to grip the post 20 by bolts 28, and a cylindrical member 29 having a projection at one end pivotally attached to the clamp 27 so as to be pivotally movable in a vertical plane. The anchorage members 22 may be adjusted vertically on the posts 20, alternative positions being indicated in chain-dotted lines. The member 29 is screw threaded externally and is formed with a longitudinal slot 30 into which extends a co-axial hole 31 from the other end of the member. The cutting wire 23 extends through the hole 31 into the slot 30 and is secured to a pin 32 extending across the slot, screw-threaded rings 33 and 34 mounted on the member 29 being placed one on each side of the pin 32 so that the position of the latter longitudinally of the member 29 can be adjusted.

The pulleys 24, as shown in Figure 5, are mounted between cheeks 35 brazed or similarly secured to the posts 20 on opposite sides of slots therein.

The plunger-and-cylinder device 15 is double-acting, and the plunger-and-cylinder devices 26 are single-acting, the plungers of the latter being pressure-operated in a downward direction.

Referring to Figure 6 of the drawings, compressed air is supplied from a compressor or other source to a supply conduit 36, and passes through a filter 37, and regulating valve 38 to a pipe junction at 39, from which one branch pipe leads to a two-way valve 41, whilst the other branch leads to another pipe junction at 42 from which a pipe leads into one end of the body of a change-over valve 43 and a second pipe leads, through a second regulator 44 and a valve 45 hereinafter described, to the upper ends of the plunger-and-cylinder devices 26. The two-way valve 41 is connected to the other end

of the body of the change-over valve 43, and the said change-over valve includes a slidable plunger 46 which, when subjected at one end to pressure coming through the two-way valve 41, connects the said two-way valve through a flow-control unit 50 to the upper end of the plunger-and-cylinder device 15, and connects the lower end of the device 15 to exhaust. When the two-way valve 41 is closed to the supply pressure, the end of the change-over valve 43 connected thereto is open to exhaust, and pressure in the other end of the change-over valve body moves the plunger thereof to connect the upper end of the plunger-and-cylinder device 15 to exhaust and to connect the lower end of the said device 15 to pressure.

The flow control unit 50 comprises a flow restrictor 47 by-passed by a non-return valve 48 which allows free flow of air into the upper end of the plunger-and-cylinder device, but closes against flow in the opposite direction.

The valve 45 is arranged to connect the plunger-and-cylinder devices 26 either to pressure or to exhaust and is urged to a position in which it connects said devices 26 to exhaust by pressure in the upper end of the plunger-and-cylinder device 15 acting on a diaphragm in a chamber 49 connected to the pipe between the said device 26 and the flow-control unit 50.

With the two-way valve 41 in the position in which it connects the pressure source to the change-over valve 43, compressed air acts in the upper end of the plunger-and-cylinder device 15 to urge the table 13 to its lowermost position, and the cutting wires 23 are held so that they extend substantially horizontally across the table, the weight of the plungers of the plunger-and-cylinder devices 26 applying light tension to the said wires. A cheese to be cut is placed on the table 13, as shown in Figure 2, so that it lies below the horizontal portions of the cutting wires 23. The two-way valve 41 is then moved to its other position, so that the change-over valve 43 is operated to admit compressed air to the lower end of the plunger-and-cylinder device 15 and also to the valve 45. The table 13 is moved upwardly by the plunger-and-cylinder device 15, the valve 45 being held by back-pressure created in the upper end of the plunger-and-cylinder device 15, in a position to connect the plunger-and-cylinder devices 26 to exhaust, so that the cutting wires 23 are subjected only to light tension.

As the table 13 moves upwardly, the upper surface of the cheese engages the cutting wires 23 and moves them upwardly with it. The plungers of the plunger-and-cylinder devices 26 are lifted by the cutting wires and the said wires, because they are anchored at one end, are drawn across the

surface of the cheese and, depending on its hardness, may or may not cut into it to some extent. When the table 13 reaches its uppermost position, as shown in Figure 3, the upper surface of the table is slightly above the original plane of the cutting wires 23 and, upon cessation of upward movement, the back-pressure acting on the diaphragm controlling the valve 45 is dissipated, and pressure is caused to act in the plunger-and-cylinder devices 26 to force the plungers downwardly and pull the cutting wires 23 downwardly through the cheese until they pass through its bottom surface into the grooves in the table. Figure 3 shows the wires in a position where they have begun to cut into the cheese but have not cut very deeply.

After the cut cheese has been removed, the two-way valve is again operated to reverse its position, and the table is thereby returned to its lower position.

It will be appreciated that, with the arrangement according to the invention, cutting tends to commence at the edges of the cheese and not right across the top as would be the case with a fixed and tensioned wire, and moreover the cut is effected with a drawing action owing to the fact that the cutting wires are anchored at one end and pulled at the other end.

The machine may be adapted for cutting cheeses into more than four pieces by using a greater number of cutting wires spaced at suitable angular intervals, each such wire being connected to a plunger-and-cylinder device.

WHAT WE CLAIM IS:

1. A cheese cutting machine comprising a vertically movable power-operated table to support a cheese to be cut, a plurality of cutting wires extending across the table and connected to downwardly-acting power-operated pulling means, the said cutting wires being so supported as to lie, when the machine is not operating and the table is in its lower position, in a plane substantially parallel to that of the table and spaced above it by a distance greater than the height of a cheese, and control means for the power-operated table and for the power-operated

pulling means whereby the cutting wires are free to move upwardly with the table during upward movement of the table, the pulling means being brought into operation automatically by cessation of upward movement of the table.

2. A cheese cutting machine according to Claim 1, wherein the cutting wires are each anchored at one end to an upstanding frame surrounding the table, each wire passing over a guide on the frame opposite to its anchorage point and being attached at its other end to the plunger of a fluid-pressure operated plunger-and-cylinder device arranged to exert a downward pull on the said cutting wire.

3. A cheese cutting machine according to Claim 2, wherein the table is also moved upwardly by a fluid pressure operated plunger-and-cylinder device, and a valve controlling the supply of fluid under pressure to the plunger-and-cylinder devices acting on the wires is held closed during upward movement of the table by the plunger-and-cylinder device acting thereon.

4. A cheese cutting machine according to claim 3, wherein the plunger-and-cylinder device operating the table is double-acting and fluid displaced therefrom during upward movement of the table is passed through a flow restricting device to create a back pressure, the said back pressure acting to hold closed a valve through which pressure fluid is supplied to the plunger-and-cylinder devices acting on the cutting wires.

5. A cheese cutting machine according to any preceding claim, wherein the table is circular and the cutting wires extend diametrically across it.

6. A cheese cutting machine according to any preceding claim, wherein grooves are provided in the upper surface of the table to receive the cutting wires.

7. A cheese cutting machine substantially as described with reference to, and as shown in, the accompanying drawings.

For the Applicants:

F. J. CLEVELAND & COMPANY
Chartered Patent Agents
29, Southampton Buildings
Chancery Lane, London, W.C.2.

FIG. 1.

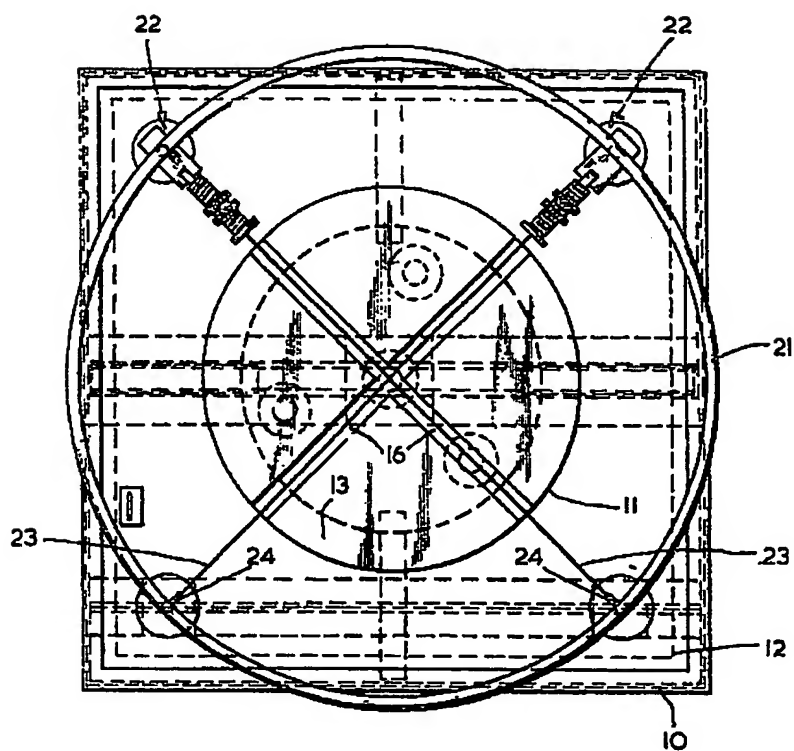


FIG. 4

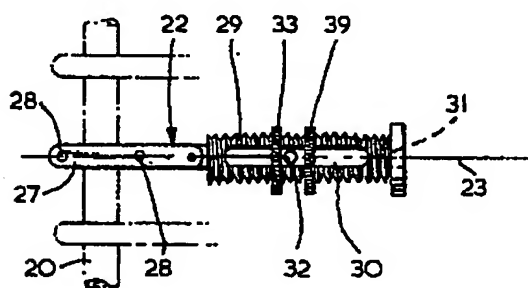
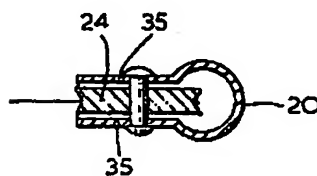


FIG. 5



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4 SHEETS

COMPLETE SPECIFICATION

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SHEETS 1 & 2

FIG. 2

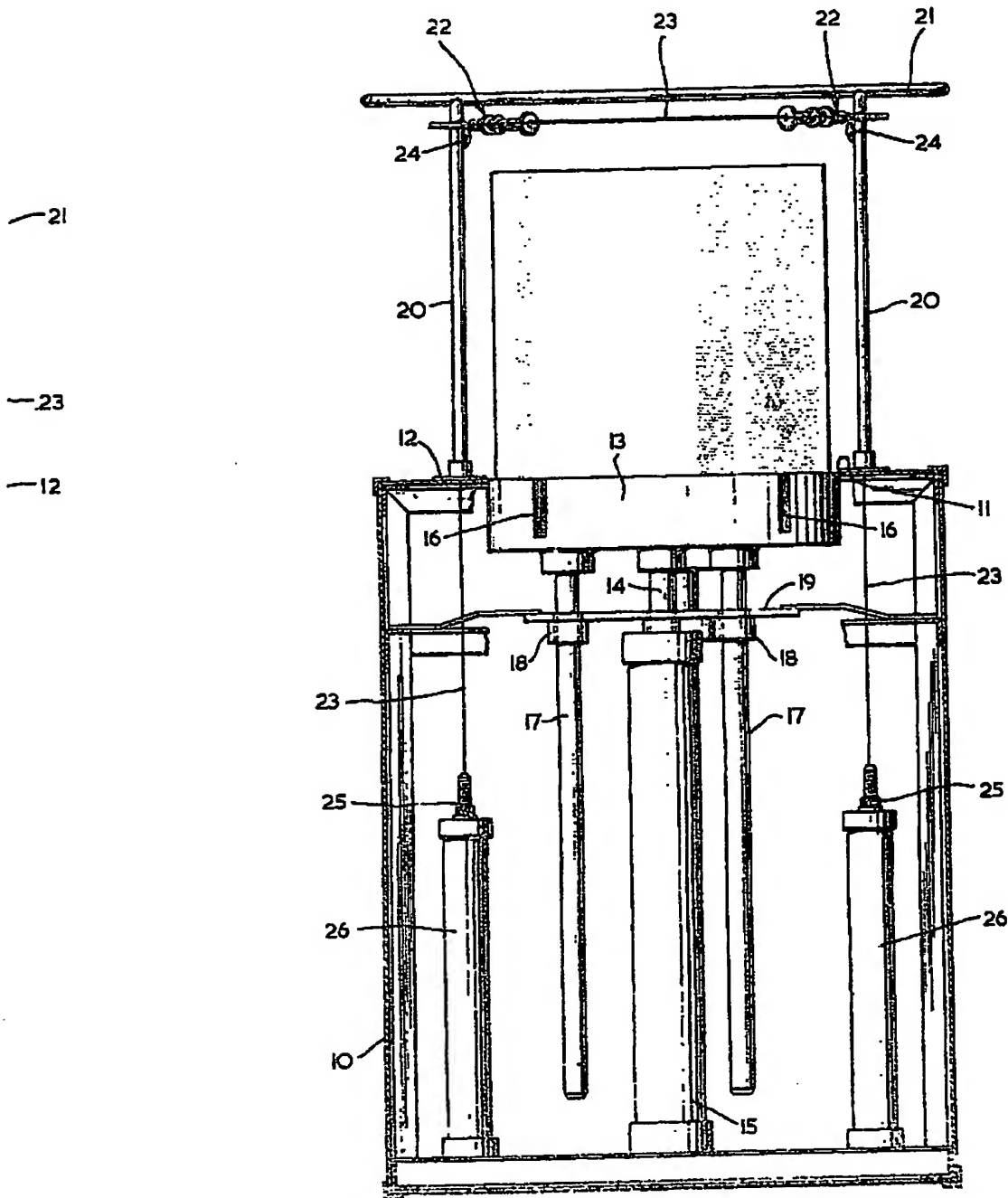


FIG. 1.

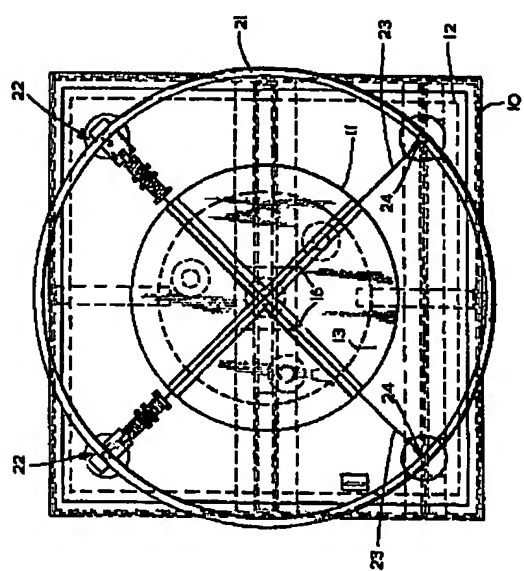


FIG. 4

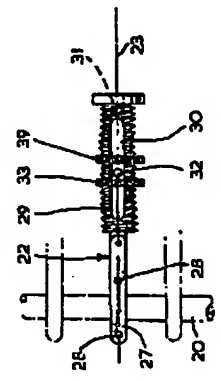


FIG. 5

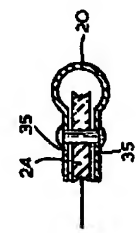


FIG. 2

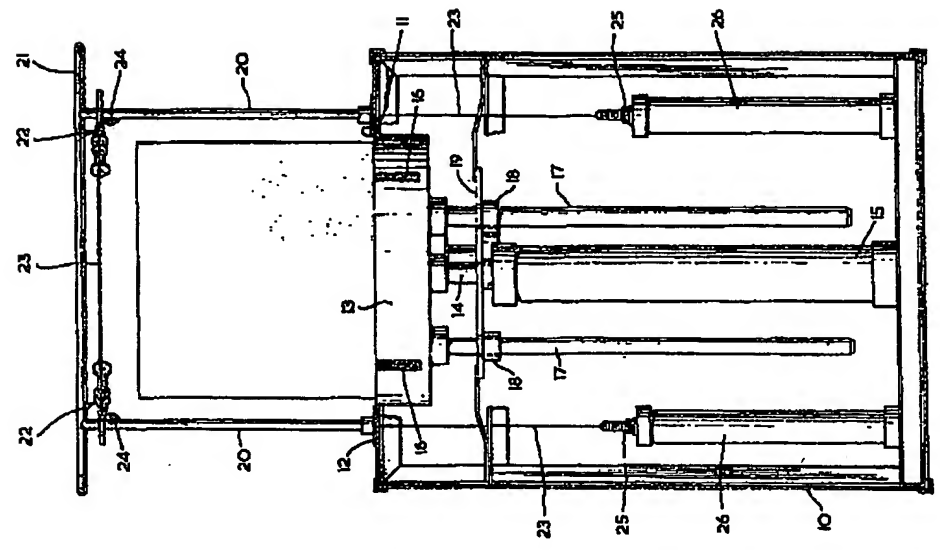
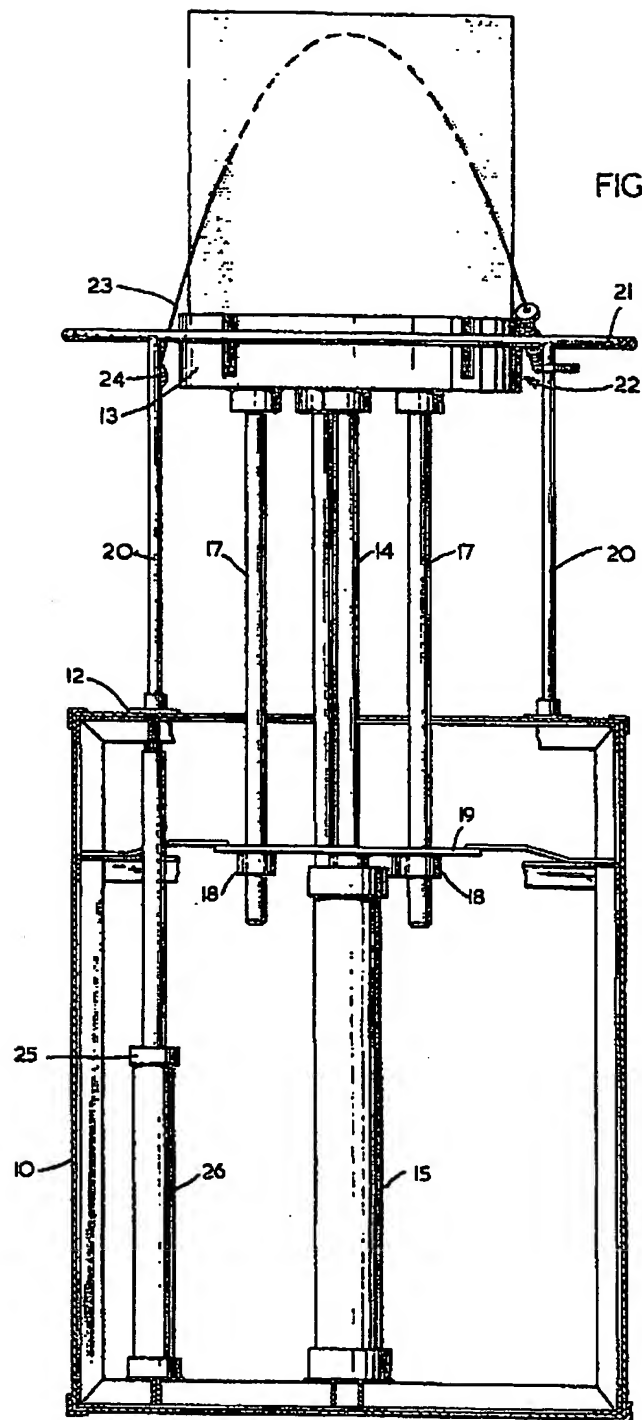


FIG. 3



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4 SHEETS

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SHEETS 3 & 4

FIG. 6

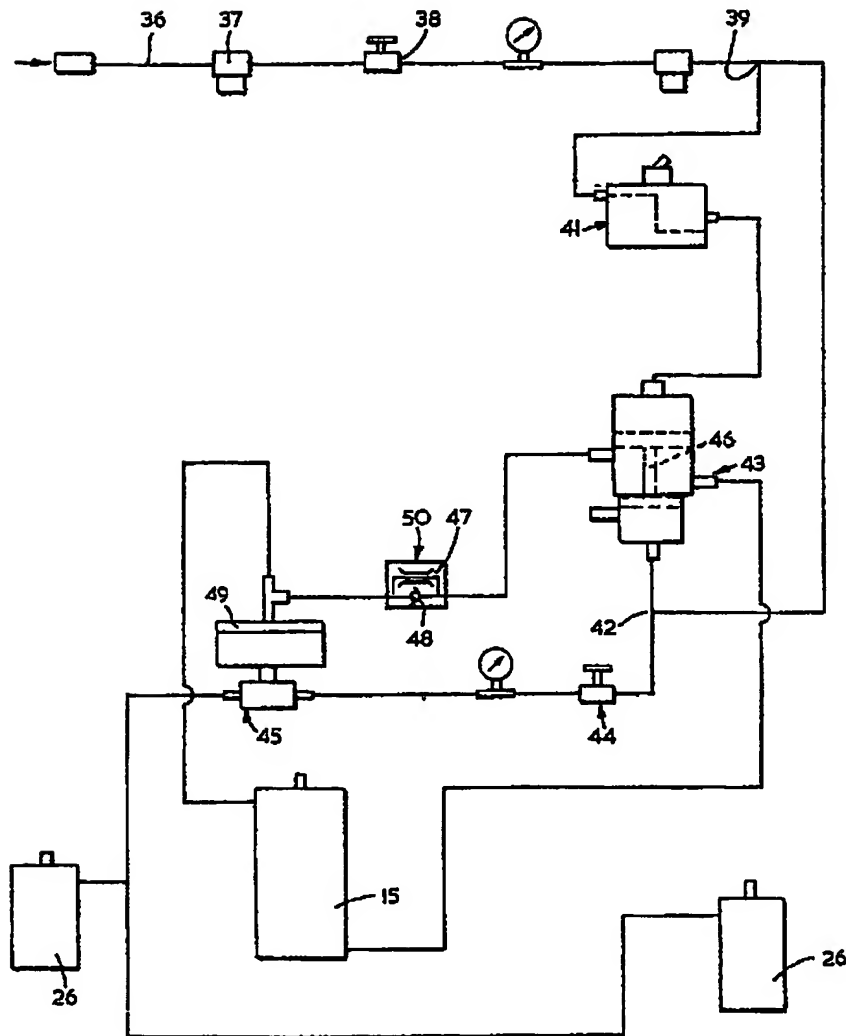


FIG. 3

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22

20

FIG. 6

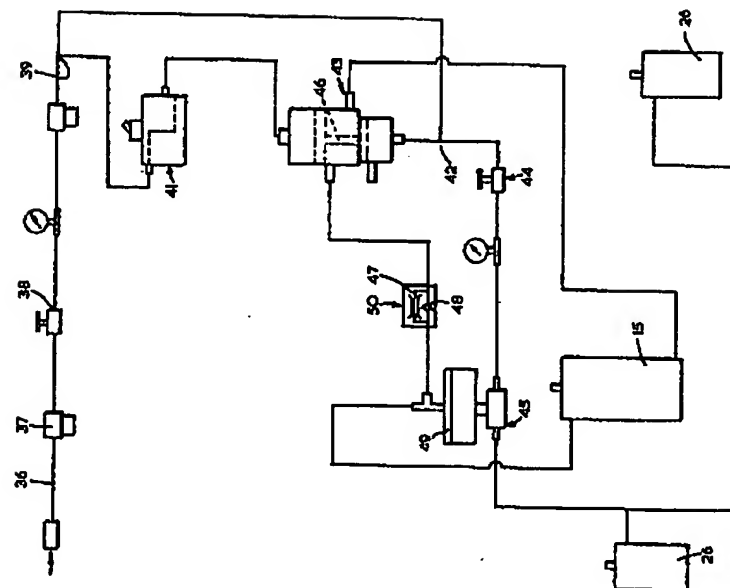


FIG. 3

